CHEMICAL COMPOSITION AND INCLUSION STUDY OF PRIMARY ACCESSORY PYRITE FROM GRANITOIDS OF THE WESTERN CARPATHIANS

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Pyrite is a common accessory mineral in West-Carpathian granites, but the I-type granite association is more typical indicating higher sulphur activity in primary melts. Several ppm of pyrite in I-type granites is typical, but sometimes the enrichment is to tens and locally hundreds to thousands ppm (g/t). Main elements, iron and sulphur show molar proportions close to ideal composition – 1 mol of iron and 2 mol of sulphur. The most important trace elements are Co, Ni and As. Their concentrations vary from a few ppm to several %, but Co dominates. Common content of Co in pyrites is around 0.4 wt% and Co and Ni substitute Fe because size of Co^{2+} and Ni^{2+} ions are similar to Fe^{2+}, and structure of NiS_2 and CoS_2 is identical to that of pyrite (VAUGHAN & CRAIG, 1978; TOSSELL *et al.,* 1981). Correlation between Co-Ni and As contents in pyrite are not explicitly discussed, although it was widely known that trace elements in pyrite increases with an increasing proportion of As (GRIFFIN *et al.,* 1991, HUSTON *et al.,* 1995). Correlation among Co/Ni between pyrite and bulk rock wasn't observed.

Character of inclusions in pyrite can be understood as a tracer of genesis and type of granite environment. The hydrothermal pyrite origin indicates presence of sulphosalt and sulphide inclusions, such as sphalerite and galena. Muscovite, K-feldspar, pure albite and apatite was characteristic in specialized S-type granites from Gemeric unit showing late-magmatic and hydrothermal conditions of origin. The rock-forming and accessory minerals typical for granite environment point to pyrite magmatic formation. The I-type granite types are indicated by inclusions of titanite and plagioclase with amount of An component up to 29.4%. The most complex mineral association with magnesiohornblende, plagioclase with increased amount of An component (31.75 up to 52.2%), epidote, titanite and chlorite show hybrid I-type granite genesis. On the other hand, also pyrite inclusions in zircons have been observed. Pyrite inclusions in zircons are locally with Fe-oxides rims. Intimate overgrowth of zircon and pyrite phase was identified in diorite rocks, whereas composition of pyrite inclusions was similar to those occurred in rock as accessory pyrite.

Remarkable is relationship between sulphates and sulphides in granitic rocks of Western Carpathians. Primary anhydrite ($CaSO_4$) is known as igneous from south Californian amphibole-biotite plutonic rocks associated with the regime of island arc (BARTH & DORAIS, 2000). In similar circumstances the primary anhydrite has been identified as inclusion in pyrite in granodiorite to tonalite from locality Dúbrava (Low Tatra Mts.) and in diorite body from Žiar Mts. as an inclusion in zircon. The primary anhydrite demonstrates a higher oxygen fugacity in early stage of granite evolution because the stability of anhydrite is above the NNO buffer. In granites Fe-Ti oxide breakdown process oscillated along NNO buffer, but usually is often significantly lower. Pyrite with anhydrite inclusion from Dúbrava probably has been originated from precipitation of iron halides and H_2S in magmatic stage.

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